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ABSTRACT

Although educators' use of computers to track student and school information with the attendant positive and negative outcomes is still in an early stage of development, accessible data from such systems could improve the objective rationality of educational and instructional decision-making as long as no one places unwarranted credibility in the information or misinterprets the data. There is some evidence that it is difficult to develop computer information systems to serve a large number of multiple and multi-level purposes because of costs, incompatible equipment, and technical problems, but a system could be used for such things as student diagnosis, program evaluations, and teacher diagnosis and assessment for use in research studies and trend analyses. A system could also change the nature of quantitative program evaluations to systems evaluations and, when combined with automated testing and instructional components, could facilitate the individualization of instruction. However, too much concentration on the quantitative, technical aspects could raise the fear of creating excessive data demands and unused information. As priorities, budgets, and technology change, it becomes difficult to plan and implement these systems, but schools can get from where they are today to where they want to be by building on the experiences of business and other service fields, and by giving attention to top-down and bottom-up considerations. (DJR)

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"Beyond 1984: The Positive and Negative Potential of Computer Supported School Focused Information Systems"

by

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(To be presented at Session 21.37 of the Annual Meeting of the American Educational Research Association, San Francisco, April 17, 1986, 8:15-10:15 AM.)

We have survived 1984 and "Big Brother" didn't become an all knowing acquirer and dispenser of information about individuals' daily lives -- not even that of students and teachers in our nation's schools. In fact, educators' use of computers to track student and school information with the attendant positive and negative outcomes is still in an early stage of development.

This symposium is intended to increase understanding of how evaluators and a wide variety of educators may take advantage of new lower cost, higher power computers to improve the efficiency, timeliness and rationality of their actions. The presenters will focus on school based information systems which may interact with established district wide computerized information systems as they have been developed in the United States, Egypt, Tunisia, and Zimbabwe. (Per Dalin who was scheduled to talk on Norway's use of computers for educational decision making regrets that he was unable to join us.) Although they will describe how school building focused instructional management information may relate to the use of computers for individualized instruction, for business management activities such as payroll and supplies, and for information sharing via electronic bulletin boards and

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ERIC type research information retrieval systems, the presenters will not spend much time on these related uses. Instead, they will describe:

1) How computer based systems can help with the daily management of school activities by sharing reports on student's schedules, attendance, abilities and needs with the school staff.

2) How a comprehensive computerized system may combine information on students such as diagnostic and standardized achievement test scores, career interests, attendance patterns, and course placement that has usually been available only on separate systems.

3) How these fairly comprehensive information banks may be used to provide information on the progress of entire classes or specific educational treatments as well as on certain aspects of the whole school.

4) How educators outside the data processing office may now gain immediate access to the records and analytic, comparative information.

Importance of the Topic

Although the area of school focused computer information systems has not attracted the public interest to the extent of the more basic instructional uses of computers, it is essential for achieving our goal of educational improvement for the following reasons:

1) Continuous, systematic needs assessment and feedback on progress is one of the generally agreed upon elements of an effective school.

2) Support for large or small scale evaluations of specific educational programs or groups of students is becoming less common as pointed out in a 1984 Div. H sponsored AERA symposium on the future of educational evaluation (Klein, Baker, Sewell, Evans, Stufflebeam, Chelimsky and Jackson, 1984).

3) Monitoring and tailoring evaluation systems described by William Cooley in his 1983 AERA Presidential address will probably become the preferred mode of educational evaluation activity in the next decade and computer based data systems are essential to the success of this approach.

4) Computers are becoming increasingly less costly and more powerful, user friendly and convenient.

5) This gradually emerging use of computer supported school focused information has the potential for facilitating some other types of educational improvements such as the individualization of some instruction, but it may also contribute to some major educational changes such as giving the principal and teachers different kinds of power and responsibilities.

6) Misuses of this type of system such as a "1984" type of invasion of privacy could harm individual students, teachers, schools and school districts.

Historical Perspective

To put this topic in some recent historical perspective we note

that the school districts and individual school offices have traditionally had responsibility for individual student record keeping. Sometimes the district evaluators or researchers analyzed this information to identify general patterns of needs or information on changes in school population or achievement over the years. But generally, local school personnel did not make much use of this information to guide their educational decisions about the best ways to use their resources to help their students. In the 1960's some educators designed computer assisted instruction and related management information systems which would do many of the things we are still contemplating today but due to their high cost, their use was mainly limited to military and industrial training. At this time, many school districts also established data processing centers for routine student record keeping on large and expensive mainframe computers. But the full potential of using computers to help guide educational practice at the classroom, school and district levels was never realized.

In the 1980's interest in the use of computers for school management and evaluation has been growing along with the increased availability of fairly inexpensive, yet versatile microcomputers and increased public interest in student competencies, standards and the comparison of educational outcomes at the school, district and state levels. In compiling Computer Education: A Catalog of Projects Sponsored by the U.S. Department of Education, 1983 (Klein, 1984), I found 28 (out of 275 total) projects which dealt with the use of

computers to assist educators with the management of information about the instructional needs and achievements of students. Our next presenter, Adrianne Bank has been studying exciting developments in the U.S. in this area over the last few years. Much of what she has learned is contained in Inventing the Future: The Development of Educational Information Systems (in press) which she and Richard Williams have just edited. William Cooley has been developing a school focused information system in two Pittsburgh elementary schools. Some of his initial work on this is described in Decision-oriented Educational Research (1986) which he wrote with William Bickel. Katherine Boswell from the Academy of Educational Development will present a paper from her colleague Kurt Moses, who has been overseeing the use of computers for futuristic school based management information in developing countries such as Zimbabwe where he is now.

User Issues, Positive and Negative Implications

In thinking about the future of school focused computerized management information systems, I have tried to identify some key issues of concern to a wide range of potential users and the positive and negative implications of each. In many instances the positive aspects reflect my dream of what could happen, while the negative aspects indicate perceptions based on current realities and future fears.

1. Will the more plentiful and accessible data from computer based information systems improve the objective rationality of educational decision making or is this interest "a solution in search of a problem"?

POSITIVE	NEGATIVE
If educators know more about students, the effectiveness of programs, teachers, courses, schools, districts, etc., they should be able to identify special strengths and needs and implement activities to address them.	People often do not make rational decisions based on an objective examination of as comprehensive a data base as possible. Even if this information is accessible, they generally don't know what questions to ask, and are often overwhelmed and confused by the amount and conflicting nature of the data. In addition to non-use of the information, other concerns include the fear that it "could become a very expensive source of excessive and irrelevant information" (Bank and Williams, p. 40) and that some might place unwarranted credibility in the information or misinterpret the data.

2. Will roles of students, parents, teachers, administrators, evaluators and other educators change positively or negatively with increased use of computer based information systems?

POSITIVE	NEGATIVE
Having more information could increase the power of parents, teachers and older students in educational decision making. Since they often have the greatest stake in the education, this could be very positive. Instead of serving mainly as data providers, teachers could be seen as data users. Administrators may also find that comparative, trend and outlier information helps them make better instructional decisions. The ways that more information on students can help them and their parents make more informed decisions and the implications of this greater involvement have yet to be examined.	It is quite possible that the roles of these key data providers and users will not be influenced by computer information systems. Instead, the systems may be developed for easy adoption, which means, in part, that people will get what they are most used to such as printouts of test scores and traditional report cards. It is also likely that most teachers will retain their clinical orientation and that administrators will retain their more social organizational perspective (Sirotnik and Burstein (1985). If the roles change, concerns about depersonalization, lack of privacy and potential data tampering would increase, particularly if parents and students gain direct access to these information systems. (Remember the movie "Wargames"?)

3. To what extent can these information systems serve multiple purposes?

POSITIVE	NEGATIVE
The school based management information systems could be used to help with: student diagnosis, integration of testing and teaching, career guidance, placement, etc.; program, course, or materials evaluation; teacher diagnosis and assessment; and between school and district comparisons. It is also possible for the information to be used to suggest causality of outcomes by controlling for input, process and outcomes. In addition to expanding upon the types of evaluations possible, much of this information could also be used for meaningful research studies and trend analyses. Eventually it may be possible for users to obtain information which describes their needs and strengths and also	There is some evidence that it is difficult to develop computer information systems to serve a large number of multiple purposes. Many feel that such systems would be too expensive, complicated and cumbersome to operate efficiently. Others point out that it is difficult to combine both the clinical and social perspectives. There are also technical problems with making data fit the needs of multiple purposes or designing the computer software to pull together information for multiple purposes in a user friendly fashion.

identifies research and development based solutions to their needs by connecting with an ERIC type knowledge base. It may also be possible for the information to feed directly into an national statistical data collection system.

4. How feasible is multi-level use of the same data and system at the student, class, teacher, grade level, school, district, state and national levels?

POSITIVE

Educators have complained for years about repeated requests for the same information. Then when those who have requested the information finally receive it, it is often inaccurate and untimely. The computer management system could provide data in a timely way and it may also be quite accurate if the immediate data suppliers in the schools are also active users. Presumably, these first line users would be careful about obtaining

NEGATIVE

There are also substantial barriers to multi-level use of school focused information systems. The first is technical and deals with the computer hardware and software issues. Another problem is using compatible, parallel data which suits the needs of users at all levels. Some fear that no purposes will be served well if a system is designed to serve all. Analyses must also avoid unfair comparisons which become more difficult as the data base is

accurate data and correcting inaccuracies quickly. To maximize opportunities for multilevel use of this data, it is important to have compatible equipment and clear definitions to ensure data consistency. Analysis activities should also consider differences in initial learner characteristics and school treatment as well as outcomes. Eventually, multi-level systems may contribute to state and national program and instructional materials evaluation efforts, statistical data bases and research. Many aspects of national level information systems are being addressed by Academy of Educational Development projects in developing countries with centralized education systems.

expanded. There are also problems related to data ownership, confidentiality, and misuse of information.

5. How might these computer based information systems help or harm education?

POSITIVE	NEGATIVE
It is reasonable to expect that if educators use this information to make more rational, timely decisions that educational effectiveness will improve. Such a system could also change the nature of quantitative evaluations from program evaluations to system evaluations. These systems and related automated testing and instructional components should also facilitate the individualization of instruction. Multilevel uses of the systems should be particularly effective in countries or other situations where there is a fair amount of centralization and uniformity of educational activities.	Too much concentration on the quantitative, technical aspects of these systems could result in less emphasis on the equally important personal "high touch" needs. It is also possible that data errors could result in hurting and limiting the opportunities of those effected. There is also some evidence that the versatile computers may be used for unintended purposes such as playing games, or excessively by personnel who should be devoting their time and attention to other functions. However, the greatest fear is that these information systems will create excessive data demands, and that little use will be made of the information.

6. Can we get from where we are today in our knowledge and use of computer based information systems to where we want to be?

POSITIVE	NEGATIVE
We can build on experiences from business, other service fields and a wide variety of activities in education. If we are building a multilevel system it should be done with attention to top-down and bottom-up considerations. Another advantage is that many school systems already have automated system components for student records, scheduling and attendance.	From current experiences, in the U.S. we can expect slow progress in implementing anything like our dream comprehensive systems. Few educational systems have consistent plans for building these systems and even those that have plans tend to abandon them as priorities and budgets change. Changes in technology also make it difficult to plan, implement and improve these large scale systems easily and cost effectively.

In conclusion, I believe that by attending to the development of computer information systems in education, we are learning how to create a positive future that will allow us to make continued use of computer technology to improve educational decision making and simultaneously add to our research knowledge base. As long as we remain vigilant, we can build on what we have and avoid many of the problems predicted by George Orwell in 1984.

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